

Flagstaff Watershed Protection Project

Region 3 Sensitive Plants Report

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for:

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Introduction

This document discusses the effects of the Flagstaff Watershed Protection Project (FWPP) on one Region 3 sensitive plant species, Rusby milkvetch. FWPP is divided into two separate areas of the forest, the Dry Lake Hills area and the Mormon Mountain area. Rusby milkvetch occurs only in the Dry Lake Hills area of the project. No Region 3 sensitive plants have been found within the operational boundary of the Mormon Mountain portion of the project.

There are no threatened or endangered plants within the project boundaries.

Data Sources

Sources of information for this report were collected from the following resources:

- Past surveys from the Jack-Smith Schultz Project.
- Surveys in the Antelope Park area near Mormon Mountain in 2011.
- Location data for *Astragalus rusbyi* from the Arizona Heritage Database and Ecological Restoration Institute, Northern Arizona University.
- Location data from the NRM TESP/Invasives database
- SEINet data.
- Coconino National Forest Plan (1987)
- Various files

Overview of Issues Addressed

This analysis addresses the effects and mitigations of management actions needed to implement the Flagstaff Watershed Protect Project on the Region 3 sensitive plant, Rusby milkvetch, and compares the differences of effects between the four alternatives.

Affected Environment

Existing Condition

Rusby milkvetch (*Astragalus rusbyi*)

Note: Rusby milkvetch is known to occur in the Dry Lake Hills portion of FWPP. There are no occurrences in the Mormon Mountain portion of the project, which is outside of the known range of the species.

Rusby milkvetch is an upright perennial herb with pinnately compound leaves of oval leaflets. No tendrils are present on the stem. The stem can be reddish in color with dark spots along the stem. A distinguishing character is the presence of trigonus pods (triangular in cross section). Each seedpod also has a stipe, which is a narrow area at the base of the pod where it connects the plant. The flowers are white to cream color and pea-like and the plants bloom from May to September. This species is similar to the more common *Astragalus recurvus* and can be confused with it during identification. Habitats for Rusby milkvetch include aspen groves, mixed conifer, ponderosa pine/Arizona fescue, and ponderosa pine/gambel oak sites in dry or temporarily moist basaltic soils.

The range of Rusby milkvetch is limited to northern Arizona where it is mostly limited to areas north and west of the San Francisco Peaks. Some portions of the range have experienced large fires such as the Hochderffer and Horseshoe Fires in 1996, the Pumpkin Fire in 2000, the Leroux

Fire in 2001, and the Schultz Fire in 2010. Surveyors detected numerous occurrences of Rusby milkvetch in the adjacent Hart Prairie Project (2010), Wing Mountain Project (2012) and the Jack-Smith/Schultz Project (2005). The Ecological Restoration Institute at Northern Arizona University has recorded numerous locations of Rusby milkvetch in several of their restoration projects, including the nearby Fort Valley and Gus Pearson Projects.

Table 1. Locations and sites containing Rusby milkvetch in the Dry Lake Hills portion of the project area, with proposed treatments for each action alternative.

Common Name	Date	Examiners	Location	Site	Alternative 2	Alternative 3	Alternative 4
Rusby's milkvetch	7/29/2004	K. Beiler	267	7	Ponderosa Pine Fuels Reduction	Ponderosa Pine Fuels Reduction	No Treatment
Rusby's milkvetch	5/28/2013	B. Burgard, A. Boettcher	267	18	MSO Nest Fuels Reduction - Burn Only	MSO Nest Fuels Reduction - Burn Only	No Treatment
Rusby's milkvetch	7/29/2004	K. Beiler	267	37	Ponderosa Pine Fuels Reduction	Ponderosa Pine Fuels Reduction	No Treatment
Rusby's milkvetch	5/28/2013	A. Boettcher, B. Burgard	267	9A	MSO PAC Fuels Reduction	MSO PAC Fuels Reduction	No Treatment
Rusby's milkvetch	2/18/2009	D.Crisp	267	15A	Ponderosa Pine Fuels Reduction	Ponderosa Pine Fuels Reduction	No Treatment
Rusby's milkvetch	2/18/2009	D.Crisp	267	16B	MSO PAC Fuels Reduction	MSO PAC Fuels Reduction	No Treatment
Rusby's milkvetch	2/18/2009	D.Crisp	267	35B	MSO PAC Fuels Reduction	MSO PAC Fuels Reduction	No Treatment
Rusby's milkvetch	7/29/2004	K. Beiler	277	2	Ponderosa Pine Fuels Reduction	Ponderosa Pine Fuels Reduction	Ponderosa Pine Fuels Reduction
Rusby's milkvetch	8/17/2005	T. Klein	277	13	Goshawk PFA Fuels Reduction	Goshawk PFA Fuels Reduction	Goshawk PFA Fuels Reduction
Rusby's milkvetch	7/29/2004	K. Beiler	277	1B	Ponderosa Pine Fuels Reduction	Ponderosa Pine Fuels Reduction	Ponderosa Pine Fuels Reduction
Rusby's milkvetch	8/17/2005	T. Klein	277	36A	Goshawk PFA Fuels Reduction	Goshawk PFA Fuels Reduction	Goshawk PFA Fuels Reduction
Rusby's milkvetch	5/21/2013	A. Boettcher, K. Tso, B. Burgard	286	3A	Ponderosa Pine Fuels Reduction	Ponderosa Pine Fuels Reduction	Ponderosa Pine Fuels Reduction
Rusby's	8/4/2004	P. Parks	286	4A	Ponderosa Pine Fuels	Ponderosa Pine Fuels	Ponderosa Pine Fuels

Common Name	Date	Examiners	Location	Site	Alternative 2	Alternative 3	Alternative 4
milkvetch					Reduction	Reduction	Reduction
Rusby's milkvetch	8/4/2004	P. Parks	286	4B	Ponderosa Pine Fuels Reduction	Ponderosa Pine Fuels Reduction	Ponderosa Pine Fuels Reduction - Hand Thin
Rusby's milkvetch	7/28/2004	K. Beiler	287	2D	MSO Nest Fuels Reduction - Hand Thin	MSO Nest Fuels Reduction - Hand Thin	MSO Nest Fuels Reduction - Hand Thin
Rusby's milkvetch	7/29/2004	P. Parks	287	9A	Mixed Conifer Fuels Reduction	Mixed Conifer Fuels Reduction	Mixed Conifer Fuels Reduction
Rusby's milkvetch	8/2/2004	P. Parks	287	9B	Mixed Conifer Fuels Reduction	Mixed Conifer Fuels Reduction	No Treatment

Desired Condition

- The desired future condition for Rusby milkvetch is to **maintain or increase** the populations and potential habitat for it within the project area. Manual direction (FSM 2670.5(19)) emphasizes that management actions should avoid or minimize impacts to sensitive species. Mitigating measures should be incorporated into project design and implementation as necessary to minimize impacts to sensitive plants.

Environmental Consequences

Data Sources

Sources of information for this report were collected from the following resources:

- Past surveys from the Jack-Smith Schultz Project.
- Current surveys by Flagstaff District Botany Crew.
- Surveys in the Antelope Park area near Mormon Mountain in 2011 by CREC and F.S. personnel
- Location data for *Astragalus rusbyi* from the Arizona Heritage Database and Ecological Restoration Institute, Northern Arizona University.
- Location data from the NRM TESP/Invasives database
- SEINet data.
- Coconino National Forest Plan (1987)
- Various files

Design features

Table 2. Design Features

#	Mitigation	Why
1	Determine potential occurrences and habitat of Region 3 sensitive plants in potential activity areas when planning for implementation. Identify potential species and survey the area to be treated before implementation	.Forest Service policy and Manual Direction
2	Mitigate loss of individuals and groups of Rusby milkvetch during management activities by avoiding known locations. See Table 3.	Mitigates effects to TES Plants
3	Where possible, place mechanically-created slash piles on previously used locations such as old piling sites, old log deck sites, or other disturbed sites to avoid severe disturbance to additional locations.	Reduces loss of native seed bank, limits extent of severe disturbances and reduces severely disturbed sites that are more prone to invasion by noxious or invasive weeds.
4	Prohibit mechanical slash pile construction within populations of Rusby milkvetch	Mitigates effects of high intensity burning to Rusby milkvetch.
5	Construct slash piles at least 10 to 20 feet away	Mitigates effects of burning to Rusby

#	Mitigation	Why
	from known populations of Rusby milkvetch.	milkvetch.
6	Prohibit temporary road construction or reconstruction within known populations of Rusby milkvetch	Mitigates effects of disturbance and burning to Rusby milkvetch
7	Prohibit construction, reconstruction or log landings in identified populations of Rusby milkvetch	Reduces loss of native seed bank, limits extent of severe disturbances and reduces severely disturbed sites that are more prone to invasion by noxious or invasive weeds
8	Deferrals and groups may include Rusby milkvetch plant groups where practical, using areas not occupied by the plants as openings. <ul style="list-style-type: none"> • Monitor the effects of treatment on Region 3 sensitive plants after treatments are completed 	Reduces management impacts to individual plants and groups.

Connected Actions, Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis

Only those actions that are related to the Dry lake Hills portion of the project are included here. The Mormon Mountain portion of the project is outside of the known range of Rusby milkvetch and it is not expected to occur there.

See also [cumulative effects](#) below.

Table 3. Connected Actions, Past, Present and Foreseeable Actions

	Past	Present (ongoing)	Reasonably-foreseeable
Forest Thinning & Burning Projects	Fort Valley Experimental Forest (thinning & burning)		
		Wing Mountain Fuels Reduction Project	
	Eastside Fuels Reduction Project: approx. 16 acres of thinning around communication towers done around 2008; 85 acres hand thinning along Elden Lookout Rd (past and ongoing); part of the Weatherford Task order outside FWPP project area (along with JSS). Hand thinning occurring within the FWPP project boundary currently and on-going.		
	Jack Smith Schultz Fuels Reduction Project (and ongoing) Orion Timber Sale to be offered in 2014. Hand thinning occurring within the FWPP project boundary currently and on-going.		
	Elden Small Project (thinning and burning)		

	on 200 acres) 2002		
			4FRI
			Treatments on the Navajo Nation parcel (approx. 140 acres) as well as adjacent State and private land
	Railroad Timber Sale (2010)		
Wildfires	Schultz Fire (2010) 15,075 acres. BAER work included mulching, seeding and salvage, and hazard tree mitigation		
	Radio Fire (1977) 4,594 acres		
	Leroux Fire (2001)		
Restoration Work	Fort Valley Restoration (2001)		
			4FRI Spring Enhancements
	Aspen Protection and Restoration		
	Bebb's Willow Restoration		
Restoration Work	Schultz Reforestation	Reforestation of severely burned areas.	
	Schultz Sediment Reduction (acres)		
Recreation	Arizona Trail construction		
		Special Use Events	
		Fort Valley Motorized Trails	
		Multi-use throughout DLH (hiking, mountain biking, camping) and trail maintenance	
			MEDL
Grazing	Peaks Allotment (pastures not grazed in approx.. 17 years; deferred from grazing now)		

Lands	Mineral withdrawal Dry Lake Hills Area (2000).		
	White Vulcan Mine		
	Travel Management Rule		
	Snowbowl Improvements – Waterline to convey reclaimed water to ski area.		
Road maintenance	Reconstruction and maintenance of Forest Roads including 420 and 556		
4FRI First EIS		Analyses of treatments within the range of Rusby milkvetch not included in previously analyzed areas including tree harvesting, burning, road construction, maintenance and decommissioning. These analyses will eventually allow implementation of restoration treatments throughout the range of Rusby milkvetch.	
Noxious or invasive weed treatments	Manual, chemical and biological control of noxious or invasive weeds within the habitat of Rusby milkvetch.		

Alternative 1 – No Action

Under this alternative, no new areas would be analyzed for treatment in the Flagstaff Watershed Protection Project area. Implementation of previous NEPA decisions, including Jack Smith Schultz and the Eastside Fuels Reduction and Forest Health Restoration projects could continue; however no mechanical or hand thinning outside of those project boundaries would occur as a part of the Flagstaff Watershed Protection Project. No road improvements would be needed to facilitate removal of commercial timber products along the major forest roads being considered for use in this project including FR 132.

Direct Effects and indirect effects

There would be no direct or indirect effects from management actions to any of the Region 3 sensitive species addressed above because none of the activities being considered in this analysis would occur. However under this alternative, the risk of high-severity wildfire would continue. Indirect effects to Rusby milkvetch could occur from such a wildfire, and include impacts from the fire itself, suppression activities (e.g. fireline construction), and potential flooding post-fire.

Cumulative Effects

Cumulative effects from the No Action Alternative include the overall increased acreage on the Flagstaff Ranger District susceptible to high-severity wildfire.

Alternative 2 – Proposed Action with Cable Logging Emphasis on Steep Slopes

Alternative 2 includes the updated proposed action with an emphasis on the use of cable logging wherever plausible. The FWPP project area includes approximately 10,544 acres; roughly 1,737 of those acres are either non-treatable due to rock faces and/or boulder fields, or are not slated to be re-analyzed in this project. Treatments would include mechanical and hand thinning as well as prescribed fire on the remaining acres (approximately 8,810 acres).

Mechanical tree thinning would occur within Mexican spotted owl protected activity centers (MSO PACs) with a desired condition of trees greater than 16 inches dbh contributing more than 50 percent of the stand basal area and maintaining a minimum of 40 percent canopy cover in pine-oak and 60 percent in mixed conifer per the MSO Recovery Plan (2012), followed by prescribed burning. Hand thinning up to 9 inches dbh and prescribed burning would also occur within MSO nest/roost habitat in coordination with the US Fish and Wildlife Service (FWS) to reduce the risk of high severity wildfire (See **Error! Reference source not found.** for more information). No cable logging would occur within MSO nest cores. Some treatments proposed within occupied PACs may need to occur during the breeding season (March 1-August 31) and would be coordinated with FWS. Treatments in nest cores would not occur during the breeding season.

Prescribed fire would include initial pile burning to remove slash accumulated through harvesting, followed by broadcast burning. Maintenance burning may occur every five to seven years following implementation in order to maintain lower fuel loading levels and to restore a frequent, low-severity fire regime. Mixed conifer on steep slopes may only receive one broadcast burn through the life of the project due to the difficulty of implementation in these fuel types and terrain, and also because the historic Fire Return Interval in some vegetation types is historically longer than the life of this project. Prescribed burning techniques in wet mixed conifer would target accumulated dead and down material rather than using broadcast burning ignition patterns. Other slash removal options as described in the Implementation Methods section could also be used in lieu of burning, including biomass removal.

Campfire Closure Order

The proposed action would also include establishing a permanent campfire restriction order in the Dry Lake Hills portion of the project area to limit the potential for human-caused wildfire. The current temporary campfire restriction order (Number 04-11-06-F) has been in effect since June, 2011 (reissued June 2013 for two years), and prohibits building, maintaining, attending, or using a fire, campfire¹, or stove fire² (36 CFR § 261.52(a)). The Proposed Action would extend this order permanently in the project area.

Forest Plan Amendments

The Coconino National Forest is currently operating under the 1987 Coconino Land Management Plan (Forest Plan), as amended; however the Forest is in the process of revising the Forest Plan,

¹ Campfire: means a fire, not within any building, mobile home or living accommodation mounted on a motor vehicle, which is used for cooking, personal warmth, lighting, ceremonial, or aesthetic purposes. Fire includes campfire.

² Stove fire: means a campfire built inside an enclosed stove or grill, or a portable brazier, including wood and charcoal fires.

with the Record of Decision (ROD) for the revised plan anticipated for release in early 2015. Depending on the timing of the release of the final Forest Plan document, the final FWPP analysis will be consistent with the revised Forest Plan. The following three project-specific, non-significant Forest Plan amendments would only be required if a decision for this project is signed prior to implementation of the revised Forest Plan. In other words, no Forest Plan amendments would be anticipated if FWPP is implemented under the revised Forest Plan.

Two project-specific, non-significant amendments to the Coconino National Forest Land Management Plan (Forest Plan; 1987, as amended) would be required to implement the proposed action. A site (project) specific plan amendment is a one-time variance in Forest Plan direction for the project; Forest Plan direction reverts back to its original language/direction upon completion of the specified project. The language proposed does not apply to any other forest project.

A revised MSO Recovery Plan, issued by the U.S. Fish and Wildlife Service (FWS) was finalized in December of 2012 (USDI 2012). The current Forest Plan is consistent with the previous MSO Recovery Plan (USDI 1995). For this project, a Forest Plan amendment would be needed to utilize the revised recovery plan direction if it is different than what is currently included in the Forest Plan. The proposed Forest Plan amendments include:

Amendment 1 Modify Forest Plan language to allow mechanical treatments in MSO PACs up to 18 inches dbh and hand thinning treatments up to 9 inches dbh and prescribed burning within MSO nest/cores. The monitoring requirement specified under the Forest Plan would be amended to include the monitoring plan developed by the Forest Service, U.S. Fish and Wildlife Service, and the Rocky Mountain Research Station referenced in the following section titled, “Monitoring.” This amendment would also remove timing restrictions within MSO PACs for the duration of the FWPP project. Treatments within PACs would be accomplished as quickly as possible to reduce the duration of impacts, and would be coordinated with FWS. The purpose of this amendment would be to facilitate treatment in high-priority locations such as Mexican spotted owl occupied habitat to prevent high-severity wildfire. This is based on language in the Mexican Spotted Owl Recovery Plan (2012), which states, “[wildfires] result in the most significant alteration of owl habitat and hence, have the greatest potential for loss of habitat.”

Amendment 2: Removing language restricting mechanical equipment to slopes less than 40 percent and language identifying slopes above 40 percent as inoperable. This amendment would allow mechanical harvesting on slopes greater than 40 percent within the project area.

It would be necessary to allow for use of specialized mechanical equipment to cut and remove trees on steep slopes to reduce the risk of high-severity wildfire in this project area due to the preponderance of areas with greater than 40 percent slope in the project area. Furthermore, since the Forest Plan was written and amended, mechanized ground-based equipment has progressed to be able to operate on steep slopes more effectively. While this specialized equipment is not commonplace in this region due to the high cost of its use, the approval of the City bond makes the use of such equipment a possibility for this project. In order to be able to utilize such equipment to treat slopes above 40 percent in the project area and meet the purpose and need, this Forest Plan amendment is needed.

Direct and Indirect Effects

Direct effects would include loss of individual plants or groups through management actions. Factors contributing to these effects would include disturbance from management actions such as activities associated with tree removal, prescribed burning, road reconstruction, maintenance and

decommissioning, temporary road construction and decommissioning. Under this alternative, a series of corridors to accommodate cable logging would be established in areas with steep slopes.

Activities associated with tree removal and prescribed burning may cause some immediate losses of individuals and groups but would be beneficial in the long term by reducing competition from overstocked forests, increasing the amount of available sunlight and by increasing available nutrients. In a long-term ponderosa pine ecological restoration study in the Fort Valley Experimental Forest, Rusby milkvetch was an indicator species of tree thinning and prescribed burning, showing a positive response to treatments after five years (Laughlin et al, 2008). Some individuals may be lost during prescribed burning, especially in areas where only isolated individuals occur or in areas where plants were not detected during surveys. However prescribed burning may have beneficial direct and indirect effects on all understory vegetation including Rusby milkvetch. Burning is a disturbance that can release nutrients, reduce plant competition, and increase the amount of available sunlight light.

Most prescribed burning would be of low severity. In some cases, fire severity may be higher in limited areas depending on variables such as management goals, weather, fuel conditions and topography. In these areas, there would be limited negative direct effects through deaths of scattered individuals or groups of Rusby milkvetch if they occur at that particular location. Limited loss of small groups of plants in these cases would not significantly contribute to the overall decline of populations of this species within the project area or over the range of Rusby milkvetch. The indirect effects of higher fire severity in these areas would be similar to those for slash pile burning, described below.

One of the associated activities with several treatments includes piling of slash from management activities. Slash piles may have negative direct and indirect effects on all understory vegetation including Rusby milkvetch. Slash pile construction could be a possible direct negative effect if the pile is placed in or near existing populations of Rusby milkvetch. Pile burning would create locally severely burned areas at pile sites, which is a negative indirect effect. Consequences include, but are not limited to, the reduction or loss of the seed bank on these sites (Korb, 2001); death or reduction of soil organisms on the pile sites (Raison, 1979; Ballard, 2000; Korb et al., 2004) and development of hydrophobic soil (Kaye and Hart, 1998; Ballard, 2000). Slash pile sites are more prone to invasion from noxious or invasive weeds than surrounding areas and contribute to the persistence and spread of noxious or invasive weeds in treated areas (Korb et al, 2004). Mitigation for these effects is to use previously disturbed areas including old pile sites or previously used decking areas where available instead of creating new sites within the forest.

An indirect effect of management actions within the potential habitat of Rusby milkvetch includes an increased risk of invasion from noxious or invasive weeds. These effects would be mitigated by incorporating the Best Management Practices described in Appendix B of *Final Environmental Impact Statement for the Integrated Treatment of Noxious or Invasive Weeds, Coconino, Kaibab and Prescott National Forests* (2005). Incorporation of the Best Management Practices would mitigate the effects of increased disturbance from management activities, and help to control the spread and introduction of weeds within the habitat of Rusby milkvetch. See Appendix B for noxious for invasive weed locations.

Direct and indirect effects of temporary road construction, road maintenance, road reconstruction or decommissioning include destruction of individual plants, localized disturbance of suitable habitat and the potential introduction of noxious or invasive weeds. These effects would be mitigated by surveying the areas where activities would occur as well as nearby areas that may be disturbed and by avoiding existing plant populations.

In this alternative, cable corridors would be established to facilitate removal of trees on steep slopes. Due to the steepness of the terrain, it may not be feasible to survey and avoid plants in these areas, which may result in loss of individuals or groups. All trees would be removed in the corridors, which are approximately 12 feet wide, resulting in a heavily disturbed area of approximately 191 acres total in the Dry Lake Hills. As a result, these areas may be more prone to weed infestations. This would impact the habitat of all understory plants including Rusby milkvetch. See the weed report for more details.

The permanent campfire restriction proposed from the Dry Lake Hills Area would help reduce the risk of human caused wildfires and would therefore reduce the risk of wildfire to understory plant communities including Rusby milkvetch.

Cumulative Effects

[See also Connected Actions, Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis.](#)

The boundary for this discussion includes the range of Rusby milkvetch within the Coconino National Forest. The timeframe for this discussion is from 1999 when Rusby milkvetch was added to the Region 3 Sensitive Species list for Coconino National Forest. Effects to Rusby milkvetch before 1999 include past management actions by the U.S. Forest Service such as grazing, timber sales and prescribed burning within the project area and throughout its range. The effects of these actions are unknown but contribute to the current condition for the species and its habitat. The end point for this discussion is approximately 10 years into the future.

There are occurrences of Rusby milkvetch in previously analyzed fuels reduction projects including Eastside Fuels Reduction and Forest Health Project (2006), the Jack Smith/Schultz Fuels Reduction and Forest Health Project (2008), Hart Prairie Fuels Reduction and Forest Health Project (2010), Railroad Timber Sale (2010?) and Wing Mountain Fuels Reduction and Forest Health Restoration Project (2012). The effects of those projects were similar to the effects discussed above. Findings in those projects were “may effect but not likely to adversely to adversely affect.” Mitigations for those projects have reduced the effects of these projects on Rusby milkvetch to non-significant levels.

Fire suppression and past alteration of the fire regime through suppression have affected all vegetation including Rusby milkvetch through changes in tree density and understory species composition. Elimination of fire in the project area and throughout most of the range of Rusby milkvetch has allowed tree canopy and stand density to increase in some areas, reducing the abundance or eliminating of most understory species including Rusby milkvetch. The elimination of fire has also resulted in the increase in litter in some areas which has negatively affected understory plant species by eliminating plants and by contributing to the increase in fire spread, length of residence time of fire and fire severity.

The Leroux Fire (2001) contained occurrences of Rusby milkvetch. Several of these occurrences were documented within the fire perimeter after the fire occurred. Manual, biological and chemical treatment of Dalmatian toadflax infestations have been conducted in the fire area but no adverse effects to Rusby milkvetch have been observed from these treatments.

The Schultz Fire (2010) contained several occurrences of Rusby milkvetch. Some of these plants were eliminated in the fire and the habitat in some areas was severely altered. The effects of large, high severity wildfires such as the Schultz Fire last for many years and long-term alteration

of habitat occurs. In addition to the wildfire itself, severe flood damage occurred in some areas as a result of the loss of vegetation and ground cover, severely altering the habitat for Rusby milkvetch in some areas. Management actions to reduce the flooding risk to private property include seeding, mulching, road reconstruction and maintenance and channel construction and maintenance. The extent of the effects to Rusby milkvetch and its habitat are unknown. These actions were authorized in several analyses including the Inner Basin Waterline Reconstruction Project (2011), three Categorical Exclusions for reforestation, hazard tree removal, and rehabilitation work (2011), and the Schultz Sediment Reduction Project (2012).

The Radio (1977) Fire and the rehabilitation efforts for it were past activities within the range of Rusby milkvetch but are outside the timeframe of this discussion. Therefore, the effects of the fire and resulting management actions to control the fires and rehabilitate the effects are considered part of the existing condition.

In a long-term ponderosa pine ecological restoration study in the Fort Valley Experimental Forest, Rusby milkvetch was an indicator species of tree thinning and prescribed burning, showing a positive response to treatments after five years (Laughlin et al, 2008).. Drought may also affect the occurrences of Rusby milkvetch. The species may be absent from certain areas during times of prolonged lack of precipitation and then re-emerge when conditions are more favorable. Additional restoration activities in the range of Rusby milkvetch include activities for aspen restoration, Bebb's willow restoration and springs enhancement activities that will be authorized in the first EIS decision. All of these activities are small in areal scale but may affect a few individuals of Rusby milkvetch.

Rusby milkvetch is grazed by cattle and wild herbivores and this may affect the ability to detect occurrences during certain times if plants have been recently eaten. The range of Rusby milkvetch within the project area includes only the Dry Lake Hills portion of the project. For the purposes of livestock grazing, this area is included in the Peaks Allotment which was analyzed for the reauthorization of cattle grazing in 2010. Portions of the Peaks Allotment that occur within the project area where not considered for reauthorization in the 2010 decision so no cattle grazing will occur in the portion of the Dry Lake Hills area affected by this analysis. Wild grazers may still consume Rusby milkvetch in the project area. Deer and elk may preferentially select legumes when they find them. Small animals such as rodents may also eat Rusby milkvetch. The cumulative effects of grazing include past and present loss of individual plants to grazing animals and alteration of habitat through animal impacts such as trampling and compaction.

Rusby milkvetch has been observed along the Schultz Trail, which is adjacent to the project area. Several of the locations detected by survey crews are along the trail. Trail users may impact individual plants at these locations through trampling and compaction of soil. Special use events may occasionally impact individual Rusby milkvetch plants but at a non-significant level. There are numerous user created trails in the Dry Lake Hills as well as recreational activities such as rock climbing and mountain biking. The effects of these activities on Rusby milkvetch are unknown but will be addressed in a future analysis for recreation in the Mount Elden Dry lake Hills Area.

In 2000, the Forest withdrew the San Francisco Mountain and Mount Elden areas from mineral exploration. This withdrawal could have indirect long-term beneficial effects on species such as Rusby milkvetch by preserving habitat that might otherwise be altered through mineral exploration.

A mining operation, the White Vulcan Mine altered potential habitat for Rusby milkvetch in the localized area of the mining operation. Active mining no longer occurs at the site but stockpiled materials are still being removed.

The Coconino National Forest implemented the Travel Management Rule in 2011. As a result, cross-country travel was eliminated and the mileage of roads open to public travel was reduced. This resulted in the reduction of the effects from motorized travel such as crushing of plants; damage to potential habitat such damage to soils and fragmentation of habitat.

In 2005, the Forest signed a decision allowing expansion the facilities at the Arizona Snowbowl. Artificial snowmaking was part of this decision. To facilitate snowmaking, a waterline was constructed from wastewater treatment facilities in Flagstaff to the Arizona Snowbowl. During the construction of the waterline, several Rusby milkvetch plants were destroyed but the project finding of effect for the project was a “may effect but not likely to adversely affect” the existence of Rusby milkvetch.

The management actions proposed for this project would have no significant negative effects on the overall distribution and abundance within the project area or within the total range of Rusby milkvetch, provided the mitigations recommended in this document are incorporated into the project design and implementation. The management actions would not significantly contribute to the cumulative effects discussed above, provided they are mitigated as recommended. The project would have beneficial direct and indirect effects on Rusby milkvetch by reducing fire risk and therefore the threat of severe wildfire within the potential habitat of Rusby milkvetch within the project area. Additionally, all understory plants including Rusby milkvetch would benefit from the reduction of tree density and canopy in certain areas of the project by reducing competition for nutrients, light and growing space.

Routine road maintenance within the range of Rusby milkvetch may occasionally impact Rusby milkvetch individuals but at non-significant levels.

As a result of the Schultz Fire and accompanying flooding (2010) major roads in the fire area were heavily damaged resulting in the need for major reconstruction on these roads. Some individuals of Rusby milkvetch may have been lost in these areas. The extent of the loss from management activities was likely small compared to the habitat alteration from the fire and flood.

Manual, chemical and biological control of noxious or invasive weeds in the range of Rusby milkvetch have occurred and will continue to occur. There is a slight but insignificant risk of damage or loss to individuals during the implementation of manual or chemical treatments. There is no risk to Rusby milkvetch from biological control because insects developed for biological control are species-specific. In the long-term, weed control will have beneficial effects to Rusby milkvetch by reducing competition from weeds and by improving habitat conditions.

Alternative 3 – Proposed Action without Cable Logging

Alternative 3 would be similar to Alternative 2; however this alternative would address visual concerns and distribution of snags and large trees due to the absence of proposed cable corridors. Under Alternative 3, treatments would utilize ground-based harvesting across the majority of the project area, with helicopter logging for critical areas that are too steep, rocky, or inaccessible to be treated by steep slope ground-based equipment. No cable logging would occur under this alternative, which would reduce the need to remove the large trees and snags on steep slopes and also the need to create corridors. The enclosed cabs of steep-slope machinery precludes the need to remove hazard trees, and though areas proposed for treatment by helicopter would still need to

have hazard trees removed, the distribution of snags and large trees could be factored into treatment placement more easily.

Direct Effects and Indirect Effects

The effects of this alternative are similar to those for Alternative 2 except there would be no cable logging and therefore no creation of corridors. Tree removal on steep slopes would be facilitated by the use of specialized ground based equipment or by helicopters. There would be no highly disturbed areas for logging corridors such as those discussed in alternative 2. Therefore the acreage of severe disturbance would be lower for Alternative 3 than for Alternative 2.

All other effects of this alternative are the same as Alternative 2.

Cumulative Effects

The cumulative effects of this action are the same as those for alternative 2.

Alternative 4: Minimal Treatment Approach

This alternative would be similar to Alternatives 2 and 3; however the purpose of Alternative 4 is to analyze only the amount of treatment necessary to minimally meet the purpose and need. Treatments would only be proposed for those areas with dense fuel loading where topography aligns with prevailing winds, and the probability of severe from a wildfire is greater. Based on the analysis of the effectiveness of these minimal treatments, this alternative may be modified to ensure it meets the purpose and need for the project or dropped from further consideration.

Alternative 4 incorporates the Large Tree Retention Strategy (LTRS) provided by the Center for Biological Diversity during the scoping period for this project. Alternative 4 contain the Forest Plan amendment contained in Alternatives 2 and 3 related Mexican spotted owls to ensure the treatments proposed in MSO habitat align with the 2012 MSO Recovery Plan. This alternative would also allow mechanical equipment on slopes greater than 40 percent with a Forest Plan amendment. The LTRS would restrict the cutting of all trees larger than 16 inches dbh within the ponderosa pine vegetation type except for those areas identified as “exceptions,” including:

- Seeps and Springs
- Riparian
- Wet Meadows
- Encroached Grasslands
- Aspen Forest and Woodland
- Ponderosa Pine/Gambel Oak Forest
- Within Stand Openings
- Heavily Stocked Stands with High Basal Area Generated by a Preponderance of Large Young Trees

As the LTRS was developed specifically for ponderosa pine, the restrictions would not apply to mixed conifer areas. The LTRS is included in the project record and includes more details on the exception categories.

Treatments are proposed for those areas with dense fuel loading where topography aligns with dominant winds and the probability of severe effects to soil resources from a wildfire is greater, based on FLAM MAP 5.0 modeling of both fire behavior and fire spread under Schultz fire weather conditions. Specifically, factors considered include: fire risk rating, potential damage to

soils (from high severity fire and also harvesting methods), MSO habitat, and the type of harvesting methods necessary to affect change.

Under Alternative 4, approximately 3,459 acres along the base of Dry Lake Hills and Mount Elden and the upper, flatter tops would receive basically the same treatments proposed in Alternatives 2 and 3, though under this alternative more areas are proposed for hand thinning and prescribed burning instead of cable or helicopter logging in order to reduce the potential impacts from temporary road network associated with those harvesting method. Additionally, treatments are focused on the area south and east of Forest Road 420; the portion of the project area between Forest Road 420 and the Kachina Peaks Wilderness could still be treated but under the constraints of the analysis and decision for the Jack Smith Schultz Fuels Reduction and Forest Health Restoration Project. Thus, no new analysis would be performed for those areas under this alternative.

The Spruce Avenue Wash was identified as a high priority area due to the fuel loading, topography, size and also its location relative to the City of Flagstaff and MSO PACs. The portion of the Elden MSO PAC within the Spruce Avenue Wash would also be treated under the same parameters described in Alternatives 2 and 3. The Schultz MSO PAC and nest core were identified in conjunction with the FWS as high priority areas, and would also receive the same treatment described for Alternatives 2 and 3.

Areas not included in this alternative would be designated as No Treatment. All treated acres would include prescribed burning in the manner described under Alternative 2: initially pile burning to remove slash accumulated through harvesting, followed by broadcast burning. Maintenance burning may occur every five to seven years following implementation in order to maintain lower fuel loading levels and to restore a frequent, low-severity fire regime. Mixed conifer on steep slopes may only receive one broadcast burn through the life of the project due to the difficulty of implementation in these fuel types and terrain, and also because the historic Fire Return Interval in some vegetation types is historically longer than the life of this project. Other slash removal options as described in the Implementation Methods section could also be used in lieu of burning, including biomass removal.

Direct and Indirect Effects

In comparison to Alternatives 2 and 3, fewer areas containing Rusby milkvetch would be treated (see table 1). Many occurrences of Rusby milkvetch are in areas that would be untreated in this alternative due to steep slopes and inaccessibility. This would result in no disturbance to plants from management actions associated with tree removal in these areas. However, the risk of loss individual plants or alteration of habitat due to uncontrolled wildfire would remain higher as compared to Alternatives 2 and 3 because fuels in these areas would not be reduced.

No cable corridors would be constructed in this alternative. Therefore, the high levels of disturbance and associated impacts to Rusby milkvetch discussed in alternative 2 above would not occur.

This alternative focuses on the area south and east of Forest Road 420. The area above FR420 to the wilderness boundary would be treated under separate NEPA prepared for Jack-Smith/Schultz. The effects to Rusby milkvetch in that area have already been addressed and mitigation measures have been described in the Jack-Smith/Schultz analysis.

In this alternative, more hand thinning would occur compared to alternatives 2 and 3. Therefore the levels of disturbance in areas of hand thinning are expected to be lower, especially in areas of steep slopes that would have been treated using cable logging or specialized equipment.

In this alternative, fewer temporary roads would be built. Disturbance from road construction, maintenance and decommissioning that would occur as a result of these actions would therefore also be less when compared to Alternatives 2 and 3.

Effects of Forest Plan Amendments

The two proposed Forest Plan amendments would occur under all action alternatives. Amendment 1 would incorporate the most recent Recovery Plan for Mexican Spotted Owl and would allow higher levels of thinning and burning within MSO habitat than was previously authorized. This would result in more open stand conditions as compared to past treatments in similar areas. The effects would be similar to those discussed for amendment 1 including higher levels of disturbance, more open conditions and reduced competition for resources. With the removal of timing restrictions for MSO, management activities would be allowed to occur during the growing season of Rusby milkvetch making the top portions of the plant more susceptible to destruction during activities as compared to treatment within MSO PACs in the past. This could lead to destruction of the above ground biomass of individual Rusby milkvetch plants during certain growing seasons, reducing such functions as the production of seed by these individuals.

Amendment 2 would remove slope restrictions in the current Forest Plan (1987), and would allow tree removal on slopes greater than 40%. Equipment such as cable logging, helicopter logging or specialized ground based equipment would be needed to accomplish the treatments. In this alternative, cable logging would occur and would result in the establishment of approximately 191 acres of heavily disturbed areas. Individual or plant groups may be destroyed in these corridors during their establishment and use. The long-term effects are unknown but would result in open, treeless areas for a prolonged period of time.

Table 4. Rusby milkvetch in areas to be treated and above 40 percent slope.

Common name	Slope class	Location	Site
Astragalus rusbyi	41 - 55%	267	7
Astragalus rusbyi	41 - 55%	267	16
Astragalus rusbyi	41 - 55%	267	35
Astragalus rusbyi	41 - 55%	267	37
Astragalus rusbyi	55% +	287	2
Astragalus rusbyi	41 - 55%	287	9

Cumulative Effects

The cumulative effects of this action are the same as those for Alternatives 2 and 3.

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Appendix A. Region 3 Sensitive Plants for Flagstaff Ranger District

Species Name	Species Status			Present in project area
	Federal	State	Forest Service	
San Francisco Peaks Groundsel, <i>Senecio franciscanus</i> (<i>Packera franciscana</i>)	T			N
Mt. Dellenbaugh Sandwort, <i>Arenaria aberrans</i>	--	SNR	Sen	N
Rusby's Milkvetch, <i>Astragalus rusbyi</i>	--	S3	Sen	Y
Crenulate Moonwort, <i>Botrychium crenulatum</i>		SH	Sen	N
Disturbed Rabbitbrush, <i>Chrysothamnus molestus</i>		S3	Sen	N
Arizona Bugbane, <i>Cimicifuga arizonica</i>	--	S2	Sen	N
Arizona leatherflower, <i>Clematis hirsutissima</i> var. <i>hirsutissima</i>		S2	Sen	N
Rock Fleabane, <i>Erigeron saxatilis</i>	--	S3	Sen	N
Sunset Crater beardtongue, <i>Penstemon clutei</i>		S2	Sen	N
Flagstaff beardtongue, <i>Penstemon nudiflorus</i>		S2S3	Sen	N
Arizona Phlox, <i>Phlox amabilis</i>		S2	Sen	N
Bebb's Willow, <i>Salix bebbiana</i>		SNR	Sen	N
Table Legend: Federal Status: E = Endangered, T = Threatened, P = Proposed, C = Candidate State Status: S1 = critically imperiled, S2 = imperiled, S3 = vulnerable to extirpation or extinction, S4 = demonstrably widespread, abundant, and secure. Forest Service Status: Sen = Sensitive				